200314645-1

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#### REMARKS

This is a full and timely response to the non-final Official Action mailed November 1, 2006. Reconsideration of the application in light of the above amendments and the following remarks is respectfully requested.

# Claim Status:

Claims 1-62 are currently pending for further action. No claims are added or cancelled by the present paper.

## 35 U.S.C. § 112, Second Paragraph:

The recent Officer Action rejected claims 14 under 35 U.S.C. § 112, second paragraph, due to a phrase, "said force generating voltage," which allegedly laced antecedent basis. Claim 14 has accordingly been amended herein to provide clear antecedent basis for the claim term in question. Following this amendment, all the remaining claims are believed to be in compliance with 35 U.S.C. § 112, and notice to that effect is respectfully requested.

### Prior Art:

Claims 1-3, 5-9, 12-16, 18-22, 24-26, 28-29, 31-33, 35-38, 55-56 and 58-60 were rejected as being unpatentable under 35 U.S.C. § 103(a) over the combined teachings of U.S. Patent No. 6,329,738 to Hung et al. ("Hung"), U.S. Patent No. 6,727,562 to Han et al. ("Han") and U.S. Patent No. 5,088,806 to McCartney et al. ("McCartney"). For at least the following reasons, this rejection is respectfully traversed.

#### Claim 1 recites:

- A diffractive light device (DLD) comprising:
- a substrate;
- a force plate disposed on said substrate, said force plate configured to produce an electrostatic force in response to an applied voltage;
- a pixel plate disposed adjacent to said force plate, wherein a position of said pixel plate is partially set by a flexure coupled to said pixel plate; and
- a temperature sensor thermally coupled to said DLD, wherein said temperature sensor is configured to produce a temperature compensated voltage in response to a thermal measurement performed by said temperature sensor.

In contrast, the combination of Hung, Han and McCartney fails to teach or suggest this subject matter. The recent Office Action attempts to cobble together elements from unrelated technologies in an unreasonable combination based on hindsight using Applicant's disclosure.

The Office Action first argues that Hung teaches the claimed DLD at Figs. 21-22. (Action of 11/1/06, p. 2). This is incorrect. Applicant's specification clearly defines a DLD as follows. "Diffractive Light Devices (DLDs) produce colors based on the precise spacing of a pixel plate to related lower (and possibly upper) plates." (Applicant's specification, paragraph 0003). Hung does not teach or suggest a DLD. Rather, Hung merely teaches a diffraction grating that functions as an optical filter. According to Hung,

[w]hen light 192 from a broadband source is directed onto the array of mirrors, the heights of the mirrors control the optical path length of light reflected from the mirrors. Specifically, path of a light ray reflected from the grating depends on the height of that mirror from which the ray was reflected. This effect results in a phase shift between reflected light rays, and leads to the formation of a diffracted light beam 194. Collection of this diffracted light beam 194 at an angle, theta., corresponding to the selected mirror heights, enables detection and analysis of wavelength-specific optical information. Thus, the diffraction grating 180 functions as an electrically-programmable optical filter, where the heights of the mirrors implement an optical diffraction transfer function."

(Hung, col. 26, lines 55 et seq.) (Emphasis added).

Thus, Hung's device does not produce colors based on the precise spacing of a pixel plate to related low plates. Hung has nothing to do with a DLD.

Next, forgetting that it earlier referred to Hung at Figs. 21 and 22, the Office Action argues that Hung teaches the claimed substrate, force plate and pixel plate in Fig. 1b. (Action of 1/11/06, p. 2). Specifically, the Action argues that Hung teaches the claimed pixel plate at element 30 of Fig. 1b. This is clearly incorrect.

Fig. 1b of Hung doesn't even illustrated an optical device. "FIG. 1B is a schematic side-view diagram of a doubly-supported beam 25 provided by the invention for producing leveraged bending of a portion of the beam." (Hung, col. 8, lines 42-45). Thus, Fig. 1b has nothing to do with a DLD as claimed. "A deflected region 30 is located between the actuated regions, central to the beam." (Hung, col. 8, lines 50-51). Thus, element 30 is a deflected portion of a beam, *not* a pixel plate in a DLD. Thus, contrary to the assertions of the Office Action, Hung fails to teach or suggest the DLD or the pixel plate of a DLD for which the Office Action cites Hung in the first place.

"To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For any and all of these reasons, the rejection based, in part, on Hung should be reconsidered and withdrawn.

Next, the Office Action concedes that "[n]either Hung nor Han expressly disclose, a thermal sensor coupled to a DLD." (Action of 1/11/06, p. 3). Consequently, the Office Action cites to McCartney. However, McCartney also does not teach or suggest a DLD. McCartney does not even teach or suggest a microelectromechanical system (MEMS). Rather, McCartney is directed to a liquid crystal display (LCD).

As will be well-known to those of skill in the art, an LCD operates on entirely different principles than does a DLD or other MEMS. According to McCartney, "it is necessary that the temperature of the liquid crystal material of the display be high enough for

sufficient display response time." (McCartney, col. 4, lines 9-12). Accordingly, McCartney teaches a temperature sensor and "a digital signal that identifies the voltage needed, at the temperature determined by the temperature sensing element to obtain the correct optical transmission," i.e., the desire response time. (McCartney, col., 4, lines 24-33).

This has nothing whatsoever to do with the claimed DLD, in which temperature affects the spring constant of a flexure rather than the response time of a liquid crystal. (Applicant's specification, paragraph 0023). Consequently, the teachings of McCartney, in combination with Hung and Han, would not reasonably suggest the claimed "temperature sensor thermally coupled to said DLD, wherein said temperature sensor is configured to produce a temperature compensated voltage in response to a thermal measurement performed by said temperature sensor." (Claim 1) (emphasis added). Obviously, the voltage compensation for driving a cold liquid crystal is entirely different from, and unrelated to, the claimed voltage compensation for temperature that adjusts the diffractive optical cavity of a DLD.

In sum, one of skill in the art would not have found it obvious to take the temperature compensation for an LCD taught by McCartney and apply such to the entirely different system represented by the claimed DLD. Only hindsight based on Applicant's specification makes this unreasonable proposition possible. See, e.g. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988) ("One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.") For at least these additional reasons, the rejection of claim 1 should be reconsidered and withdrawn.

In an alternative, and entirely duplicative, rejection, the recent Office Action rejected claims 1, 10, 11, 23, 30, 39, 61 and 62 as being unpatentable over the combination of Hung and Han with U.S. Patent No. 5,903,251 to Mori et al. ("Mori"). For at least the following reasons, this rejection is also traversed.

Initially, Applicant notes that claims 23, 30, 39, 61 and 62 are dependent claims which cannot logically be rejected here without also addressing their corresponding independent claims. Consequently, this rejection as it applies to claims 23, 30, 39, 61 and 62 is clearly inappropriate and must be withdrawn.

With respect to claim 1, the Mori reference is equivalent to, and equally irrelevant with, the McCartney reference discussed above. Like McCartney, Mori teaches a "liquid crystal apparatus that changes a voltage level of a correction pulse based on a detected temperature." (Mori, title). Therefore, the combination of Hung, Han and Mori fails for all the reasons given above including the failure of Hung to teach a DLD or pixel plate and the unreasonableness of the suggestion that teachings regarding an LCD would be applied by one of skill in the art to the claimed DLD operating on entirely different principles. For at least these reasons, the rejection of claim 1 based on Hung, Han and Mori should also be reconsidered and withdrawn.

The dependent claims of the application further recite subject matter that is not taught or suggested by the prior art cited. Specific, non-exclusive examples follow.

Claim 3 recites "wherein said temperature compensated offset voltage is configured to compensate for a change in spring force exerted on said pixel plate by said flexure at a measured temperature." Claims 25, 33, 41 and 56 recite similar subject matter. None of the

cited prior art references teach or suggest a temperature compensated offset voltage configured to compensate for a change in spring force exerted on a pixel plate by a flexure. None of the cited references even teach or suggest a flexure supporting a pixel plate. "To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least these additional reasons, the rejection of claims 3, 25, 33, 41 and 56 should be reconsidered and withdrawn.

### Claim 6 recites:

The DLD of claim 2, wherein said offset voltage generator comprises: a signal digitizer configured to digitize said thermal measurement; a system controller communicatively coupled to said digitizer, said system controller configured to combine said digitized thermal measurement to an uncompensated digital color count; and

a digital to analog converter communicatively coupled to said system controller, wherein said digital to analog converter is configured to convert said combined digital signal into a thermally compensated analog voltage. (Emphasis added).

In contrast, the cited combination of Hung, Han and McCartney does not teach or suggest "an uncompensated digital color count." Such a count is used only in a DLD, not an LCD. None of the cited references, therefore, can teach or suggest the claimed system controller configured to combine a digitized thermal measurement with an uncompensated digital color count. "To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least these additional reasons, the rejection of claim 6 should be reconsidered and withdrawn.

Claim 8 recites "a summing circuit, wherein said summing circuit is configured to combine said temperature compensated offset voltage with a color voltage bias to produce said temperature compensated voltage." Claims 21 and 37 recite similar subject matter. In contrast, the cited combination of Hung, Han and McCartney does not teach or suggest "a color voltage bias." A color voltage bias is used only in a DLD, not an LCD. None of the cited references, therefore, can teach or suggest the claimed summing circuit configured to combine a temperature compensated offset voltage with a color voltage bias as claimed. The portion of McCartney cited by the Office Action in this regard predictably does not even mention a color voltage bias. (Action of 11/1/06, p. 6). "To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least these additional reasons, the rejection of claims 8, 21 and 37 should be reconsidered and withdrawn.

### Independent claim 12 recites:

A micro-electro mechanical system (MEMS) comprising:

a substrate;

a pixel plate coupled to said substrate;

a force plate disposed on said substrate adjacent to said pixel plate, wherein said force plate is configured to exert an electrostatic force on said pixel plate; and

a temperature sensor thermally coupled to said MEMS;

wherein said MEMS is configured to adjust said electrostatic force in response to a temperature measurement performed by said temperature sensor. (Emphasis added).

In contrast, as demonstrated above, McCartney teaches adjusting a driving signal for an LCD based on a temperature measurement. There is no reference of record that teaches or suggests a MEMS configured to adjust an *electrostatic force* exerted by a force plate on a pixel plate in

response to a temperature measurement. The recent Office Action utterly fails to indicate how or where the cited prior art teaches this subject matter.

"To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least this reason, this rejection of claim 12 should be reconsidered and withdrawn.

### Claim 13 recites:

The MEMS of claim 12, further comprising:

a support post extruding from said substrate; and

a flexure coupling said pixel plate to said support post, wherein said flexure is configured to exert a spring force on said pixel plate opposing said electrostatic force; said spring force predictably varying with a variation in temperature.

In contrast, as demonstrated above, Hung does not teach or suggest the claimed pixel plate or flexures coupling the pixel plate to a support post. The recent Office Action incorrectly cites to Hung for this subject matter. (Action of 11/1/06, p. 6). As demonstrated above, Hung does not teach or suggest a pixel plate, let alone flexures supporting a pixel plate from a support post. "To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least this additional reason, the rejection of claim 13 should be reconsidered and withdrawn.

Claim 14 recites "wherein said MEMS is further configured to vary said electrostatic force to compensate for a variation in spring force provided by said flexure at a measured temperature." There is no cited prior art that teaches or suggests this subject matter.

Moreover, the recent Office Action fails to indicate how or where the prior art teaches this

subject matter. For at least these additional reasons, the rejection of claim 14 should be reconsidered and withdrawn.

Claim 15 recites "an offset voltage generator, wherein said offset voltage generator is configured to vary said electrostatic force based on said temperature measurement." There is no cited prior art that teaches or suggests this subject matter. The cited prior art does not teach or suggest varying an electrostatic force based on temperature measurement. Moreover, the recent Office Action fails to indicate how or where the prior art teaches this subject matter. For at least these additional reasons, the rejection of claim 15 should be reconsidered and withdrawn.

Claim 16 recites "wherein said temperature compensated offset voltage generator is configured to produce an offset voltage to compensate for said variation in spring force provided by said flexure." There is no cited prior art that teaches or suggests this subject matter. Moreover, the recent Office Action fails to indicate how or where the prior art teaches this subject matter. For at least these additional reasons, the rejection of claim 16 should be reconsidered and withdrawn.

Independent claim 24 recites:

An image display device comprising:

a system controller;

a variable voltage source communicatively coupled to said system controller; and an array of DLDs communicatively coupled to said variable voltage source, each DLD of said DLD array including a substrate, a force plate disposed on said substrate, said force plate configured to produce an electrostatic force in response to a voltage applied by said voltage source, a pixel plate disposed adjacent to said force plate, wherein a position of said pixel plate is partially determined by a flexure coupled to said pixel plate, and a temperature sensor thermally coupled to said DLD, wherein said image

display device is configured to vary said electrostatic force in response to a thermal measurement performed by said temperature sensor. (Emphasis added).

In contrast, as demonstrated above, the combination of Hung, Han and McCartney fails teach or suggest an array of DLDS, each with a pixel plate positioned with a flexure, and a temperature sensor coupled to the DLD, "wherein said image display device is configured to vary said electrostatic force in response to a thermal measurement performed by said temperature sensor." For the reasons given above, Hung, Han and McCartney, taken together, do not teach or suggest any of this subject matter. "To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least this reason, this rejection of claim 23 should be reconsidered and withdrawn.

# Independent claim 31 recites:

A diffractive light device (DLD) comprising:

a substrate;

a means for producing an electrostatic force disposed on said substrate, wherein said electrostatic force is produced in response to an applied voltage;

a means for diffracting light disposed adjacent to said electrostatic force producing means, wherein a position of said light diffracting means is influenced by a means for flexing coupled to said means for diffracting light; and

a means for sensing temperature thermally coupled to said DLD, wherein said means for sensing temperature is configured to produce a temperature compensated voltage on said means for producing an electrostatic force in response to a thermal measurement.

In contrast, as demonstrated above, the improper combination of Hung, Han and McCartney fails to teach or suggest the claimed DLD. Moreover, the combination fails to teach or suggest means for diffracting light having a position influenced by means for flexing coupled thereto. The combination also fails to teach or suggest means for producing

an electrostatic force that moves means for diffracting light in response to a thermal measurement.

"To establish prima facic obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least this reason, this rejection of claim 31 should be reconsidered and withdrawn.

# Independent claim 40 recites:

A method of compensating for thermal effects in a DLD comprising: measuring a temperature of said DLD;

generating a temperature compensated offset voltage associated with an effect said temperature will have on said DLD; and

producing a temperature compensated voltage on said DLD using said temperature compensated offset voltage, wherein applying said temperature compensated voltage to said DLD compensates for said thermal effects.

In contrast, as demonstrated above, the cited combination of prior art references fails to teach or suggest a method of compensating for thermal effects in a DLD. None of the references teach or suggest measuring a temperature of a DLD. None of the references teach, suggest or enable generating a temperature compensated offset voltage associated with an effect temperature will have on the DLD. None of the references teach or suggest "producing a temperature compensated voltage on said DLD using said temperature compensated offset voltage, wherein applying said temperature compensated voltage to said DLD compensates for said thermal effects."

"To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least this reason, this rejection of claim 40 should be reconsidered and withdrawn.

Claim 46 recites:

wherein said measuring a temperature of said DLD comprises: thermally coupling a thermal sensor to said DLD; and sensing a temperature of said DLD.

As demonstrated above, the teachings of cited combination of prior art references do not include a DLD or any method related to a DLD. Consequently, there is no cited prior art that teaches or suggests this subject matter recited by claim 46. Moreover, the recent Office Action fails to indicate how or where the prior art teaches this subject matter. "To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)."

M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least this reason, this rejection of claim 46 should be reconsidered and withdrawn.

Independent claim 50 recites:

A processor readable medium having instructions thereon for: sensing a temperature change of a DLD; and modifying a voltage provided to said DLD in response to said sensed temperature change.

There is no cited prior art that teaches or suggests this subject matter. Moreover, the recent Office Action fails to indicate how or where the prior art teaches this subject matter. None of the cited prior art references teach or suggest a DLD, let alone the claimed processor readable medium for operating a DLD. "To establish prima facic obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least this reason, this rejection of claim 50 should be reconsidered and withdrawn.

#### Claim 55 recites:

- A micro-electromechanical system (MEMS) comprising:
- a flexure;
- a voltage generator; and
- a temperature sensor thermally coupled to said MEMS, wherein said voltage generator is configured to produce a temperature compensated voltage in response to a thermal measurement performed by said temperature sensor.

As demonstrated above, the cited combination of prior art references does not teach or suggest a MEMS in which a temperature sensor is coupled to the MEMS and a voltage generator produces a temperature compensated voltage in response to the sensor for the MEMS. The cited prior art only teaches temperature sensing of an LCD. "To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)."

M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least this reason, this rejection of claim 55 should be reconsidered and withdrawn.

Claims 4, 17, 27, 34 and 57 were rejected as unpatentable under 35 U.S.C. § 103(a) over the combined teachings of Hung, Han, McCartney and U.S. Patent No. 7,038,654 to Naiki et al. ("Naiki"). This rejection is respectfully traversed for at least the same reasons given above with respect to the independent claims.

In another alternative rejection, claims 40, 42, 44-46 and 49-54 were rejected as being unpatentable under 35 U.S.C. § 103(a) over the combined teachings of McCartney and U.S. Patent No. 7,019,883 to Moon et al. ("Moon"). This rejection is respectfully traversed for at least the following reasons.

Independent claim 40 recites:

A method of compensating for thermal effects in a DLD comprising: measuring a temperature of said DLD;

generating a temperature compensated offset voltage associated with an effect said temperature will have on said DLD; and

producing a temperature compensated voltage on said DLD using said temperature compensated offset voltage, wherein applying said temperature compensated voltage to said DLD compensates for said thermal effects.

As demonstrated above, McCartney has nothing to do with a DLD, but instead relates to an LCD. Expressly recognizing this fact, the Office Action argues that Moon discloses compensating for thermal effects in a diffractive light device. (Action of 11/1/06, p. 15). This is incorrect.

In Moon, the Office Action has mistaken a micromirror array for a DLD. Applicant's specification clearly defines a DLD as follows. "Diffractive Light Devices (DLDs) produce colors based on the precise spacing of a pixel plate to related lower (and possibly upper) plates." (Applicant's specification, paragraph 0003).

In contrast, Moon does not teach or suggest a DLD or any compensation for thermal effects in a DLD, as asserted by the Office Action. Rather, Moon describes a spatial light modulator that comprises a micromirror array. (Moon, abstract). Those of skill in the art would not confuse a micromirror array with a DLD. Consequently, the combination of McCartney and Moon, if there were some reason to combine the two references, fails to teach or suggest any of the subject matter of claim 40.

"To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least this reason, this rejection of claim 40 should also be reconsidered and withdrawn.

Claim 50 recites:

A processor readable medium having instructions thereon for: sensing a temperature change of a DLD; and modifying a voltage provided to said DLD in response to said sensed temperature change.

As demonstrated above, the combination of McCartney and Moon fails to teach or suggest any of this subject matter. Neither reference even mentions a DLD, let alone instructions for operating a DLD based on temperature sensing.

"To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least this reason, this rejection of claim 50 should be reconsidered and withdrawn.

Claim 41 was rejected under 35 U.S.C. § 103(a) over the combined teachings of McCartney, Moon and Hung. Claim 43 was rejected 35 U.S.C. § 103(a) over the combined teachings of McCartney, Moon and Naiki. Claims 47 and 48 were rejected under 35 U.S.C. § 103(a) over the combined teachings of McCartney, Moon and Mori. These rejections are traversed for at least the same reasons given above with respect to the rejection of claim 40 based on McCartney and Moon.

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Conclusion:

For the foregoing reasons, the present application is thought to be clearly in condition for allowance. Accordingly, favorable reconsideration of the application in light of these remarks is courteously solicited. If the Examiner has any comments or suggestions which could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the number listed below.

Respectfully submitted,

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I hereby certify that this correspondence is being transmitted to the Patent and Trademark Office facsimile number <u>571-273-8300</u> on <u>February 1, 2007</u>. Number of Pages: <u>36</u>

Rebecca R. Schow